CHAPTER 2

PRELIMINARY DESIGN CONSIDERATIONS

2-1. Existing conditions.

As an important initial step in the design process, existing maps, drawings, surveys, boring logs, and other data containing pertinent information on existing conditions in the area being sewered must be obtained. Possible sources of such information include the following:

—Installation or Facility Engineer.
—Army or Air Force using service.
—Federal Agencies such as United States Geological Survey and Soil Conservation Service.
—State, county or municipal engineering departments.
—Public utilities.
—Commercial businesses and private firms (including A/E).
—Regional or local planning boards.

2-2. Field investigations.

If maps are not available, or do not provide satisfactory information or sufficient detail of the site, field surveys must be performed. Depending on the magnitude and complexity of the project, subsurface exploration with soil borings may be required. Topographic information should show locations of all streets, buildings, pavements, sidewalks, vegetation, drainage channels, and other land surface features such as utility manholes or structures, which may influence the design and layout of the collection system. Information on existing utilities should include the location of underground water lines, sanitary sewers, storm drains, gas mains, steam tunnels, electric conduits and similar facilities. For larger projects, the character of the soil in which sewers will be constructed should be determined. The presence of rock, unfavorable soil conditions, or high groundwater table should be clearly established.

2-3. Guidelines for sewer system layout.

The development of final sewer plans must await the final site plan, the completion of field surveys, and to some extent, the establishment of floor grades. However, the development of economical site plans often requires concurrent preliminary planning of the sewer system. The location of building and lateral sewers will depend not only upon topography, but also upon the type and layout of the buildings to be served. Normally, the most practical location would be along one side of the street. In other cases they may be located behind the buildings midway between streets. In still other cases, in closely built-up areas and particularly where the street is very wide or already paved, it may be advantageous and economical to construct laterals on each side of the street. Main, trunk, and interceptor sewers will follow the most feasible route to the point of discharge. All sewers will be located outside of roadways as much as practicable, so that the number of roadway crossings will be reduced to a minimum. A sewer from one building will not be constructed under another building, or remain in service where a building is subsequently constructed over it, if any other practical location for the sewer is available. Where no other location is suitable, necessary measures will be taken to assure accessibility for future excavation and complete freedom of the sewer from superimposed building loads. The following general criteria will be used where possible to provide a layout which is practical, economical and meets hydraulic requirements:

—Follow slopes of natural topography for gravity sewers.
—Check existing maps or field surveys along prospective sewer routes to assure that adequate slopes are available.
—Avoid routing sewers through heavily wooded areas and areas which require extensive restoration after construction.
—Check subsurface investigations for groundwater levels and types of subsoil encountered. If possible, avoid areas of high groundwater and the placement of sewers below the groundwater table.
—Locate manholes at changes in direction, size or slope of gravity sewers.
—Sewer sections between manholes should be straight. The use of curved sewer alinement is not recommended.
—Manholes should be located at intersections of streets when possible.
—Avoid placing manholes where the tops will be submerged or subject to surface water inflow.
—Designer should evaluate alternative sewer routes where applicable.
—Verify that final routing selected is the most cost effective alternative that meets service requirements.

2-4. Protection of water supplies.

There must be no physical connection between a potable water line and the sewer system. Sewer design will meet the following criteria:

—Sewers will be located no closer than 50 feet horizontally to water wells or earthen reservoirs to be used for potable water supply.

—Sewers will be located no closer than 10 feet horizontally to potable water lines; where the bottom of the water pipe will be at least 12 inches above the top of the sewer, the horizontal spacing may be a minimum of 6 feet.

—Sewers crossing above potable water lines must be constructed of suitable pressure pipe or fully encased in concrete for a distance of 10 feet on each side of the crossing. Pressure pipe will be as required for force mains in TM 5-814-2/AFM 88-11, Chapter 2, and will have no joint closer horizontally than 3 feet to the crossing, unless the joint is encased in concrete. The thickness of the concrete encasement will be a minimum of 4 inches at pipe joints.

—Depressed sewers crossing potable water lines must be installed below the water line with a minimum vertical clearance of 2 feet. Sewer joints will not be closer horizontally than 3 feet to the crossing, unless the joints are fully encased in concrete as required above.